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The Effects of Visual Perceptual Problems in Children and Adults with Traumatic Brain Injury

Finding the links between symptoms, neurobiology, and treatment

continued

The Effects of Visual Perceptual Problems in Children and Adults with Traumatic Brain Injury

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Learning Objectives

After this course, participants will be able to:

- Identify at least three symptoms related to light sensitivity and visual stress.
- List three visual stress factors.
- Recognize at least three accommodations to decrease symptoms of visual stress.

The Effects of Visual Perceptual Problems in Children and Adults with Traumatic Brain Injury

**Physical Changes**

- Paralysis and motor planning
- Loss of motor coordination and agility
- Abnormal movement patterns
- Structural imbalances
- Tremors and spasticity
- Headaches/migraines
- Fatigue and weakness
- Seizures
- Oral motor dysfunction
The Effects of Visual Perceptual Problems in Children and Adults with Traumatic Brain Injury

**Cognitive**

- Attention deficit
- Poor concentration and memory
- Communication
- Problem solving
- Socialization and communication
- Difficulties initiating and planning activities
- Impulsivity and difficulty problem solving
- Poor judgment and reasoning
- Visual stress and visual distortions
- Sensory modulation and tolerances

**Behavioral**

- Agitation and irritability
- Anxiety
- Verbal and physical aggressiveness or passivity
- Impulsivity
- Depression
- Difficulty with interpersonal relationships
The Effects of Visual Perceptual Problems in Children and Adults with Traumatic Brain Injury

Functional
- Academic or work related tasks
- Computer use, writing, reading, copying
- Ambulation
- Driving
- Sports
- ADLs
- Environmental: patterns, lighting, accessibility, safety

Causes of Traumatic Brain Injury
- Strokes
- Tumors
- Disease
- Toxins
- Near drowning
- Electrocution
- Head trauma: falls, sports injuries, and vehicle accidents
- Any forceful blow to head or neck
The Effects of Visual Perceptual Problems in Children and Adults with Traumatic Brain Injury

What is the incidence of TBI?

- 1,500,000 new cases of TBI reported each year (Centers for Disease Control)
- 50,000 to 110,000 are severely disabled (National Institutes of Health)
- 5.3 million Americans living today with TBI (NIH)
- Visual stress and visual perceptual problems are reported by many people with TBI affecting reading, math, working at a computer, depth perception, safety, comfort, and many other tasks involving balance and vision

Symptoms Related to Light Sensitivity and Visual Stress

ATTENTION DEFICIT
Problems concentrating while reading or doing school work. May have difficulty staying on task, take breaks, look away, become restless, fidgety, or tired. Behavior problems.

STRAIN OR FATIGUE
Feeling strain, tension, fatigue, sleepy, or headaches with reading and other Perceptual activities. Strain can interfere with the ease of reading, studying, or even listening.

POOR DEPTH PERCEPTION
Inability to accurately judge distance or spatial relationships. May be unsure or have difficulty with escalators, stairs, sports, or driving. May get dizzy or nausea. Handwriting problems.
The Effects of Visual Perceptual Problems in Children and Adults with Traumatic Brain Injury

**Symptoms Related to Light Sensitivity and Visual Stress**

**LIGHT SENSITIVITY**
Bothered by glare, fluorescent lights, bright lights, sunlight, whiteboards, or driving at night. Discomfort or difficulty concentrating or working under bright lights or fluorescent lights and using a computer screen.

**INEFFICIENT READING**
Difficulty reading print, numbers, scantron sheets, maps, diagrams, or musical notes. Problems may include print that shifts, shakes, blurs, moves, doubles, disappears, or becomes difficult to perceive.

**SLOW READING RATE**
Inability to read letters, numbers, musical notes, or words in groups. Problems tracking, correctly identifying words, or ability to skim/speed read.

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**Allopathic and Integrative Treatment**

- Meditation, Relaxation
- Exercises, Stress Management,
- Irlen Method
- Lighting Changes
- Environmental Changes
- Acupuncture, Reiki,
- Magnets
- Yoga, Exercise,
- Breathwork, Vision
- Exercises, Brain Gym
- Biofeedback, Cognitive
- Rehabilitation,
- Chiropractic,
- Osteopathy,
- Cranial Sacral,
- Reflexology, Massage
- Therapy, OT/PT/SLP
Visual Irlen Syndrome or Scoptic Sensitivity Syndrome

VISUAL STRESS and DISTORTIONS

visual processing problems change the way we see and create stress and anxiety and can block the fluid transmission of brain body connections and communication
WASHOUT

By Andrew W. Gough &

In the present study, we investigated the behavioral and neurochemical consequences of prolonged ethanol exposure in rats. The study was conducted in a two-bottle drinking paradigm, where rats were given free access to either water or ethanol solutions. Rats were divided into two groups: a control group and an ethanol group. The ethanol group received a 15% ethanol solution ad libitum for 10 days, while the control group received only water. During the final 2 days of the study, both groups were given access to a 15% ethanol solution to determine their preference for ethanol.

Results showed that ethanol exposure resulted in a significant increase in ethanol consumption compared to the control group. Furthermore, the ethanol group had a higher body weight gain compared to the control group, indicating that ethanol consumption may have contributed to weight gain. To further investigate the behavioral consequences of ethanol exposure, the ethanol group was tested in a open field test. The open field test revealed that ethanol exposure resulted in decreased exploration and motor activity, suggesting that ethanol may have an anxiolytic-like effect.

In conclusion, the present study suggests that prolonged ethanol exposure can lead to increased ethanol consumption and weight gain, as well as decreased motor activity and exploration. These findings highlight the importance of understanding the behavioral consequences of ethanol exposure and the potential for ethanol to contribute to weight gain and other health issues.
SHAKY

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HALO

We all see things the same way. We see words in groups or phrases. The print is more dominant than the background. The print shows no movement. The printed letters are evenly black. Black print on white paper gives the best contrast for everyone. White background looks white.
Star Wars

Today is for seasonal temperatures temperature is expected, to be fair and with highs in the 70’s and lows in the 50’s. Today is for seasonal temperatures temperature is expected, to be fair and with highs in the 70’s and lows in the 50’s. The five day outlook calls for seasonal temperatures temperature is expected, to be fair and with highs in the 70’s and lows in the 50’s. Today is for seasonal temperatures temperature is expected, to be fair and with highs in the 70’s and lows in the 50’s. Today is for seasonal temperatures temperature is expected, to be fair and with highs in the 70’s and lows in the 50’s.
When Sampler CPU is boots up “Code Meter” automatically loads. This is a Wibu application (free online from Wibu.com). This is essential to recognize the DVZ-RT/Space/Library authorization USB key (dongle). This may be immediately visible because it’s in the Windows Task Tray. This runtime program is actually installed on all the DVZ-RT computers (Control and Samplers).

If the Code Meter task Tray icon is green, this means the authorization key is present on the computer being viewed. On those computers where the key is not installed, the icon will be gray, but it will work because the program accesses the fixed key over the network.

Also, on all Samplers, you will see an AI Crypt VST Host (Hexi) icon. That also loads automatically upon boot up. This AI Crypt info pertains only to turn-key systems, and will change later.

If the icon is not present, launch it from the desktop icon, or look in the Start Menu - Programs/Audio Impressions.AI Strings and launch AI Crypt. If it isn’t there, it failed to load or the Wibu key is not connected so please make sure it’s present on one of the computers, that they’re all networked correctly together, etc.

If it’s loaded, right-click on the icon and a context menu will come up. The first item will be Dismount. If all loaded correctly, Don’t select this. If the first item is “Mount” then select this (this mounts the library). If you Mount, you have to choose the image, and that’s located on the sample drive and named “aiui” (Audio Impressions Symphonic Image). You select it and mount it to x (using the dropdown menu). No letter other than x will function correctly. Note: All this will occur automatically in the final release and you shouldn’t have to do any mounting in that process works correctly.
The Mind-Body-Learning Connection
What is Stress?

Environmental Stimuli → Reaction → Stress

Environmental stimuli can place demands which exceed the brain’s ability to cope.
Visual Stress Factors

Environmental Stressors

- Lighting
- Glare
- Bright Colors
- High Contrast
- Tracking Moving Objects

- Patterns and Stripes
- Details
- Sustained Attention
- Continuous Performance

Functional Brain System

- Prefrontal Cortex: attention, organization, impulse, and mood control
- Anerior Cingulate Gyrus: gear shifter
- Basal Ganglia: movement and anxiety
- Thalamus: integrator
- Temporal Lobes: mood, memory, learning
- Parietal Lobes: sensory and direction
- Occipital Lobes: vision
- Cerebellum: processing speed
The Mind-Body-Learning Connection

ENVIRONMENT
Lighting Patterns Contrast Colors

VISUAL ACTIVITIES
Reading Writing Copying Computer Use

PERCEPTUAL STRESS

Changes in Brain Chemistry

Cortisol Serotonin Dopamine Hormone

Changes in Automatic System Endocrine System Immune System Neuropeptide System

PROBLEMS
- Physical symptoms (headache, migraine, fatigue, dizziness, stomachaches, eye strain, anxiety, irritability)
- Attention & concentration
- Learning (hypo/hyper sensitivity, memory)

Learning, reading, emotional, behavioral, or attitude problems
ADD/HD Dyslexia Conduct Disorders Psychologically Disturbed

PROBLEMS
- Sensory integration
- Depth perception
- Vulnerability to stress
- Diminished cognitive reserves

Before After
Job Performance Survey
American Journal of Learning Disabilities, 1996 with use of Irlen Method

Percent Improvement in 8 Areas

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% improvement
Job Performance Survey

- 136 randomly selected Irlen Filter users in the workplace
- 95% found significant improvement in their ability to do their job
- 94% found that their level of productivity had been significantly improved
- 91% reported a substantial decrease in the factors for absenteeism including migraines
- 91% felt increased job satisfaction

Understanding the Causal Mechanisms of Visual Processing Problems: A Possible Biochemical Basis for Irlen Syndrome?


This study found a variety of biochemical anomalies in 143 subjects with CFS who had been identified as likely to have symptoms of Irlen Syndrome. These individuals all reported headaches, photophobia, and trouble concentrating
Irlen Overlays & Spectral Filters

Irlen Screening for Overlays

- Testing takes about 1.5 hours
- Only addresses visual stress when reading
- Certified Irlen Screeners have a bachelors degree or higher and participate in a 14 hour training plus continuing education to maintain certification
- 10 colors and many combinations of overlaying of colors
- Overlays are low-cost intervention
Reasons for Screening

- **Educate** the client
  - What they see vs. what others see
    - reading, copying, math, writing, etc.
- **Counseling** tool (self-concept and behavior)
- **Differential diagnosis**
- **Treatment with specific colored overlays**

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- **Identify** those with visual stress caused by light sensitivity or scotopic sensitivity syndrome
- **Determine severity**
  (slight, moderate, severe)
- **Create awareness** of symptoms
  (see and feel)
- **Language** to talk about what you see
  (distortions and discomfort)
Irlen Overlays

- Some colors have no benefit, seen same as white
- Some colors increase discomfort and/or distortions
- One colored overlay, or combination of overlays, may minimize or stop distortions and discomfort
- Clients report considerable decrease in distortions, discomfort, migraines/headaches when reading or working at the computer using overlays
- Low cost method used to determine if client wants to go on for diagnostic testing for spectral filters
Irlen Diagnostic Testing

- **Spectral filters** worn as glasses or contact lenses

- Testing takes 2-4 hours

- Addresses light sensitivity and visual and sensory processing in all areas of functioning

- Filters all light entering the eyes and visual processing system

- More precise than overlays with thousands of combinations of layers of colors

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Irlen Diagnostic Testing

- Addresses more than reading: writing, copying, bright lights/sunlight, sports, driving, ADD/ADHD, depth perception, motor coordination, memory, body tension, problem solving, phobia/anxieties, etc.

- Certified Irlen Diagnosticians must have a masters degree or higher and participate in an extensive training program.
Benefits of Spectral Filters

- More convenient and effective
- Provide benefits to daily functioning and mental, physical and emotional health
- Provide improvements in sports, depth perception, headaches, driving, night driving, fatigue, fluorescent lights, copying, computer use, music, listening, writing, and more
- Do NOT change the color of things in the environment. Client controls environment.
Accommodations to Decrease Symptoms of Visual Stress

Contrast

- Minimize or eliminate bright or fluorescent colors
- Avoid stripes, plaids, or polka dots
- Use colored background on written information and computer work
- Avoid whiteboards and use blackboards or gray or green backgrounds
- Use colored markers or chalks instead of white

Lighting

- Reduce lighting and use dimmer control
- Use incandescent or indirect natural lighting
- Use theatrical gels over fluorescent lights
- Wear visor or brimmed hat
Classroom Modifications

Paper
- Recycled, off-white, non-glare
- Copy written materials on preferred color of paper
- Use graph paper
- Use colored overlays

Computer/Overhead Projector:
- Use colored overlays

Reading Modifications

- Irlen Spectral Filters
- Colored overlays
- Colored paper
- Graph Paper
- Magnifying bar
- Visor/brimmed hat
- Bookstand

- Dim lighting
- Avoid fluorescent lighting
- Incandescent lighting with dimmer
- Highlighters or Markers (above, below, to the side of the line)
Testing Modifications

- Tests duplicated on colored paper
- Colored plastic overlays over text
- Scantron answer sheets
  - Use a ruler
  - Duplicate on colored paper
  - Write on test sheet instead of scantron sheet
- Natural lighting

Testing Modifications

- Larger print and easy to read fonts
- Shorten answers- circle, fill in blank, etc.
- Computer with voice input and output, word prediction, etc. Change color of monitor background
- Record answers on tape recorder
Resources & Related Links

- www.irlen.com and www.IrlenVLCMD.com
- Books: Reading by the Colors and The Irlen Revolution by Helen Irlen
- Irlen Videos: www.irlen.com www.youtube.com
- Facebook page: Irlen Visual Learning Center

Self-Test for Light Sensitivity

Do any of the following bother your eyes, head, and stomach; make you dizzy, tired, nervous, anxious or irritable?

- Reading textbooks for extended periods?
- Reading on a computer for extended periods?
- Working or reading under fluorescent lights?
- Reading black print on high gloss white paper?
- Doing visually-intensive activities like needlepoint, cross stitching, woodworking, crossword puzzles?
Self-Test for Light Sensitivity

- Bothered by sunlight?
- Bothered by glare outside?
- Bothered by glare off chrome on cars?
- Bothered by glare off high gloss white paper?
- Bothered by glare on hazy days?
- Bothered by bright lights?
- Bothered by fluorescent lights?
- Bothered by headlights from oncoming traffic?
- Bothered by certain patterns or stripes?
- Bothered by bright or neon colors?

Self-Test for Light Sensitivity

- Do you become tired or drowsy under bright or fluorescent lighting?
- Do you get a headache from fluorescent lighting?
- Do you feel antsy or fidgety when under fluorescent lighting?
- Does your performance deteriorate under bright or fluorescent lighting?
Self-Test for Light Sensitivity

- Do you feel like there is too much light when reading?
- Do you feel like there is not enough light when reading?
- Do you read in dim lighting?
- Do you feel like you need less light to read?
- Do you frequently wear sunglasses?

Irlen Migraine/Headache Self-Test

Answering “Yes” to 3 or more of these questions indicates lighting, glare, and/or visual activities are triggers for your visual stress symptoms.

Determining that you may have light sensitivity, or Irlen Syndrome, does not eliminate the need to explore other factors which can also cause your visual stress symptoms.
Additional Interventions to Address Visual Stress and Light Sensitivity

- Brain Gym Exercises
- Meir Schneider’s Vision Yoga Program
- Depak Chopra’s Vision Exercises
- Chinese Eye Exercises
- Vision Therapy
- Cranial Sacral Therapy (CST)
- Acupuncture
Website Resources

- http://www.irlenvlcmd.com
Visually intensive activities cause over-activity in the brains of individuals with Irlen Syndrome. When these individuals wear their Irlen Spectral Filters, the brain calms down and brain function normalizes.

Light and the Brain, Daniel Amen, MD
In one study by draw and colleagues, comparing the brains of 42 people with Irlen syndrome to 200 age-matched individuals without any evidence of Irlen syndrome, SPECT scans showed increased activity in the brain’s emotional and visual processing center and decreased activity in the ascendant (an area that helps to integrate coordination and new information).

FNB Evidence that Precision Ophthalmic Tints Reduce Cortical Hyperactivation in Migraine
Huang et al. (2013) used fMRI to investigate differences between individuals suffering visual stress and controls in relation to migraine and to determine the effectiveness of precision-tinted colored filters for individuals suffering from visual stress. The research showed a normalization of cortical activation and spatial frequency tuning in the migrainer by precision-tinted filters that suggests a neurobiological basis for the therapeutic effect of these lenses in sight-induced cortical hyperactivation in migraine.

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Questions?

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